A Study on QoS Routing Scheme for Tactical Ad-Hoc Network

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Abstract. Recently developments in the field of telecommunications and network technology has been formed new paradigm shift in defense weapon system. The military also developing the Tactical Information Communication Network (TICN) system to meet the changing aspects of these wars. To equip its function from the battlefield, TICN system have to be received real-time information from the battlefield troop, and the key technologies that support these features is MANET (Mobile Ad-hoc Network) routing protocol. In this paper, basis on the tactical environment of small combat units, by studying on the MANET routing protocol that can be transmitted in real time & reliable information, suggest efficient routing protocol in tactical MANET that can be applicable to advanced digital battlefield.

1 Introduction

The Military has developing the Tactical information & communication network to replace current communication network system. To equip its function from the battlefield, TICN system have to be received real-time information from the battlefield troops. but, Current tactical information system has limitations on its functionality because of the information is not transmitted battlefield troops but battalion or higher. Therefore, To receive real-time information, must be introduced communication devices to the battlefield troops. and given the special circumstances of the battlefield, MANET technology will be most effective things to the battlefield troops for communicate of real-time information. In this paper, basis on the tactical environment of small combat units, by studying on the MANET
routing protocol that can be transmitted in real time & reliable information, suggest efficient routing protocol in tactical MANET that can be applicable to advanced digital battlefield. [1][2]

2 Problem Statement

2.1 Difference between Tactical Ad-Hoc and Common Ad-Hoc

If, applies the common Ad-hoc routing protocols(Shown before) in the tactical Ad-hoc network, it may cause some problems. The reason is that there are some different characteristics between common Ad-hoc and tactical Ad-hoc. and the details are as follows.

First, the node speed of tactical Ad-hoc is more faster than common Ad-hoc. Second, In tactical Ad-hoc, For tactical information in real-time transmits the streaming data(video, audio) and graphic data as well as sensing data. it means that, in tactical Ad-hoc will take a long time to transmit data. Last, In tactical Ad-hoc, unlike a common Ad-hoc does not take into account the energy consumption.

Tactical environment, the communications device will be using only a few days and moreover, because of the mobility of nodes, energy source can be replaced at any time. Therefore, due to the characteristics of the afore-mentioned tactical Ad-hoc, Routing metric in tactical Ad-hoc should be applied another metric that unlike common Ad-hoc routing. In other words, in common Ad-hoc to minimize the energy consumption, such as a hop count or energy is important metrics of routing. but in tactical Ad-hoc, reliability or delay time will be more important metrics of routing.

2.2 Connectivity Problem

Most existing researches of Ad-hoc routing, node 1 selected node 2(Fig 1.- (a)) as a relay node due to the shortest path scheme that located in the outermost of the transmission range. But in this scheme, the node 2 is likely to goes out of transmission range due to the mobility and it can say that is more apt to cause link breaks. Whereas, node 1 selected node 3(Fig 1.-(b)) as a relay node that instead of node 2, even though node 3 has the mobility, which is likely to located within the transmission range of node 1.

![Fig. 1 Selection of relay node](image-url)